

# PROBABILITY

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1) If a number is chosen at random from the set  $\{1, 2, 3, \dots, 100\}$ , then the probability that the chosen number is a perfect cube.

☒ a)  $\frac{1}{25}$

b)  $\frac{1}{2}$

c)  $\frac{4}{13}$

d)  $\frac{1}{10}$

$1^3 = 1$  ,  $2^3 = 8$  ,  $3^3 = 27$  ,  $4^3 = 64$  ,  $5^3 = 125$

$\frac{4}{100} = \frac{1}{25}$

four number satisfies the condition.

2) What is the probability of getting at least one six in a single throw of three unbiased dice.

a)  $\frac{1}{6}$

b)  $\frac{125}{216}$

c)  $\frac{1}{36}$

d)  $\frac{81}{216}$

☒ e)  $\frac{91}{216}$

To get 6 at least in one die

Possible outcome for one die =  $\frac{5}{6} \Rightarrow 1, 2, 3, 4, 5$

possible outcome for three die =  $\left(\frac{5}{6}\right)^3 = \frac{125}{216}$

This get all possible of number except 6.

Now we need to get 6 at least once so we need to do

$1 - \frac{125}{216} \Rightarrow \frac{91}{216}$

3) In a simultaneous throw of two dice, what is the probability of getting a doublet?

☒ a)  $\frac{1}{6}$

b)  $\frac{1}{4}$

c)  $\frac{2}{3}$

d)  $\frac{3}{7}$

Total outcomes =  $(6)^2 = 36$

Doublets = (1,1) (2,2) (3,3) (4,4) (5,5) (6,6)

$\frac{6}{36} = \frac{1}{6}$

4) A bag contains 4 red balls and 5 green balls and 6 white balls. A ball is drawn at random from the box. What is the probability that the ball drawn is either red or green.

a)  $\frac{2}{5}$

☒ b)  $\frac{3}{5}$

c)  $\frac{1}{5}$

d)  $\frac{7}{15}$

Total = Red + white + green =  $4 + 6 + 5 = 15$

Red = 4 white = 6 Green = 5

$P(R+G) = \frac{R+G}{T} = \frac{4+5}{15} = \frac{9}{15} = \frac{3}{5}$



5) When 4 dice are thrown, what is the probability that the same number appears on each of them

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a)  $\frac{1}{36}$       b)  $\frac{1}{18}$       ~~c)  $\frac{1}{216}$~~       d)  $\frac{1}{5}$

TOTAL POSSIBLE OUT COMES =  $(6)^4$

FAVOURABLE OUTCOME = (1,1,1,1) (2,2,2,2) (3,3,3,3) (4,4,4,4)  
(5,5,5,5) (6,6,6,6)

= 6 ways

$$P = \frac{6}{(6)^4} = \frac{1}{(6)^3} = \frac{1}{216}$$

6) The Probability that it is Friday and that a student is absent is 0.03 since there are 5 school days in a week, the Probability that it is Friday is 0.2. What is the probability that a student is absent given that today is Friday

a) 10%      ☒ b) 15%      c) 12%      d) 13%

$$P(F) = P(\text{Friday}) = 0.2$$

$$P(A) = P(\text{Absent})$$

$$P(A \cap F) = 0.03$$

$$P(A|F) = \frac{P(A \cap F)}{P(F)} = \frac{0.03}{0.2} = \frac{3 \times 10}{100 \times 2} = \frac{3}{20} = 15\%$$

using definition of Conditional probability.

7) Two dice are rolled. The probability of getting a sum of at least 9 is

a)  $13/36$       ☒ b)  $5/18$       c)  $35/36$       d)  $11/36$

$$\text{Sum of } 9 = (3,6), (6,3), (5,4), (4,5) = 4$$

$$\text{Sum of } 10 = (5,5), (4,6), (6,4), \text{ ~~(5,5)~~ } = 3$$

$$\text{Sum of } 11 = (6,5), (5,6) = 2$$

$$\text{Sum of } 12 = (6,6), \text{ ~~(6,6)~~ } = 1$$

$$\frac{10}{36} = \frac{5}{18}$$



8.) If four cards are drawn at random from a well shuffled pack of cards, what is the probability that each card is an Ace.

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a.)  $\frac{6}{52C_4}$

b.)  $\frac{4}{52C_4}$

c.)  $\frac{1}{52C_4}$

d.)  $\frac{3}{52C_4}$

CARDS = 4 sets - each set 1 ACE

ACE =  $4C_4$

TOTAL CARDS =  $52C_4$

$\frac{4C_4}{52C_4} = \frac{1}{52C_4}$

9.) A person tosses an unbiased coin. when head turns up, he gets RS. 8 and tail turns up he loses RS. 4. If 3 coins are tossed, what is the probability that he gets a Profit of RS. 12?

a.)  $\frac{3}{8}$

b.)  $\frac{5}{8}$

c.)  $\frac{3}{4}$

d.)  $\frac{1}{8}$

TOTAL OUTCOMES =  $(2)^3 = 8 =$  HHH, TTT, HHT, HTH, THH, TTH, THT, HTT

FAVOURABLE OUTCOME = 3 = HHT, HTH, THH

$\frac{3}{8}$

10.) A number  $n$  is chosen from  $\{2, 4, 6, \dots, 48\}$ . The probability that ' $n$ ' satisfies the equation  $(2x-6)(3x+12)(x-6)(x-10) = 0$  is

a.)  $\frac{1}{24}$

b.)  $\frac{1}{12}$

c.)  $\frac{1}{8}$

d.)  $\frac{1}{6}$

TOTAL VALUES POSSIBLE = 24

$\frac{48-2}{2} + 1 \Rightarrow \frac{46}{2} + 1 = 23 + 1 = 24 \text{ Terms}$

Condition satisfies are

$\frac{2}{24} \Rightarrow \frac{1}{12}$

by substitute values of  $x$  and check.  
6, 10 alone satisfying

so 2 numbers.  
out of 24 numbers.